

REMARKS

The above amendments to the above-captioned application along with the following remarks are being submitted as a full and complete response to the Office Action dated June 16, 2004 (U.S. Patent Office Paper No. 4). In view of the above amendments and the following remarks, the Examiner is respectfully requested to give due reconsideration to this application, to indicate the allowability of the claims, and to pass this case to issue.

Also, acknowledgement and consideration of the Information Disclosure Statement filed on April 19, 2004 is respectfully requested. Submitted with this response are a copy of the postcard indicating receipt on April 19, 2004 by the U.S. Patent and Trademark Office of this Information Disclosure Statement, a copy of the Information Disclosure Statement, the accompanying form PTO-1449, and the document Japanese No. 05-021909 identified on the form PTO 1449.

Status of the Claims

As outlined above, Claims 1 through 16 are presently pending. Claims 1, 2, 4, 6, 7 and 8 are being amended to correct formal errors and to more particularly point out and distinctly claim the subject invention. In addition, new claims 9 through 16 are hereby submitted for consideration.

It is respectfully submitted that a preliminary amendment was submitted concurrently with the filing of the above-referenced application on December 16, 2004, as indicated by the concurrently submitted postcard. A copy of the previously filed preliminary amendment is also submitted with this response. The preliminary amendment amended Claim 6 and added then new Claims 7 and 8 to remove the multiple dependency. Therefore, it is respectfully submitted that Claims 7 and 8 are indicated in the above Claims as "currently amended".

Additional Amendments

The specification is being amended to correct formal errors and to better disclose and describe the features of the present invention as claimed.

Prior Art Rejections

Claims 1 through 6 (understood to include through Claim 8) were rejected under 35 U.S.C. § 103(a) over U.S. Patent No. 4, 868,979 to Fukushima et al.(the '979 Patent). This rejection is respectfully traversed.

It is respectfully submitted that the '979 Patent does not disclose:

a method of fabricating a printed circuit board, wherein a mounting range setting step is such that an automatic mounting range is set within a predetermined range on a single original board and within which the chip parts mounter mounts collectively by a single mounting operation the surface mount parts in a plurality of the automatic mounting areas in the plurality of areas on the single original board, as respectively recited in independent Claim 1;

a method of fabricating a printed circuit board, wherein a first area and a second area to form a base board of the main circuit board are equally assigned to the original printed board, and an automatic mounting area is set in each of the first and second areas, and wherein the first and second areas are assigned that one of the first and second areas, if rotated by 180 degrees around the center of the original board, comes to coincide with the other, as respectively recited in dependent Claim 3; and

a method of fabricating a printed circuit board, wherein an area used as the base board of the CRT circuit board is set in each of that portion of the first area where the parts are not formed on the main circuit board and that portion of the second area where the parts are not formed on the main circuit board, wherein a CRT circuit board mounting area for mounting the chip parts to form the CRT circuit board is set in each of the areas used as the base board of the CRT circuit board, and an automatic mounting range is set to include the two CRT circuit board mounting areas, as respectively recited dependent Claim 4.

The present invention provides methods of fabricating a plurality of printed circuit boards collectively from a single original board. For example, one of such methods of the present invention includes setting a plurality of automatic mounting areas corresponding to each printed circuit board for a chip parts mounter to mount surface mount parts for forming the plurality of printed circuit boards from the single original board, setting an automatic mounting range which covers the plurality of automatic mounting areas on the single original board, and mounting the chip parts collectively by a single mounting operation corresponding to the set automatic mounting range for the plurality of the printed circuit boards on the single original board by the chip parts mounter, similar to the method recited in independent Claim 1.

According to another aspect of the present invention, one set of chip parts for fabricating a pair of large printed circuit boards of the same pattern, such as main circuit board of a TV receiver or other printed circuit board, for example, of a trapezoidal form, can be mounted collectively on one single original board, by setting a pair of the large printed circuit boards rotated by 180 degrees around the center of the original board so as to make an automatic mounting range of the chip parts as small as possible, and by mounting all the chips collectively by a chip parts mounter, such as, for example, with a template which covers the automatic mounting range smaller than that of the original board, similar to the method recited in dependent Claim 3.

Also, according to a further aspect of the present invention, one set of chip parts for fabricating a plurality of different printed circuit boards can be mounted collectively as well on one single original board, similar to the method recited in dependent Claim 4.

Therefore, according to various aspects of the present invention, a plurality of printed circuit boards of the same pattern or of different patterns, can be fabricated from a single original board effectively by a single collective mounting operation.

In contrast, the '979 patent shows a method of mounting chips for fabricating a plurality of printed circuit boards from a single original board, and that includes charging one set of chip parts for forming a single printed circuit board into predetermined accommodation

holes of a template, carrying the one set of the chip parts to one of predetermined mounting areas by shifting the original board and/or the template horizontally or vertically, mounting the one set of the chip parts on one of the printed circuit boards, and repeating the above steps until all the printed circuit boards on the original board are mounted with the chip parts.

Thus, the '979 Patent method discloses, in contrast to the present invention, shifting separately, or successively, the multiple divided regions provided on the circuit board to the position of the housing recesses by means of shifting means so that the chips can be mounted on each multiple divided region. (Col.2, lines 4-21; Col.5, lines 1-22).

Therefore, in the '979 Patent, the operation of carrying the one set of the chip parts to one of the predetermined positions on the original board and the operation of mounting the one set of the chip parts charged in the template to the predetermined mounting area must be repeated as many times as the number of the printed circuit boards to be fabricated from the single original board. On the other hand, according to the present invention, a single mounting operation collectively mounts the surface mount parts in a plurality of the automatic mounting areas in the plurality of areas on the single original board, as respectively recited in independent Claim 1.

Furthermore, in contrast, when two printed circuit boards, such as of a trapezoidal form, are to be fabricated from a single original board, the method as disclosed in the '979 Patent, it is respectfully submitted, would not allow the template to perform a rotational shift, since the movement of the template toward the automatic mounting areas is limited in the '979 Patent to horizontal and/or vertical directions. Consequently, according to the '979 Patent, especially in case of fabricating two printed circuit boards of a trapezoidal form from a single original board, the size of the original board typically would be larger, since the two trapezoidal printed circuit boards would typically not be set facing each other in a 180 degrees rotated position on the original board, thereby promoting an increase in the manufacturing cost.

On the other hand, according to an aspect of the present invention, a first area and a second area to form a base board of the main circuit board can be equally assigned to the

original printed board, and an automatic mounting area can be set in each of the first and second areas, and wherein the first and second areas can be so assigned that one of the first and second areas, if rotated by 180 degrees around the center of the original board, comes to coincide with the other, as respectively recited in dependent Claim 3.

Also, the statement in the Office action that “FUKUSHIMA et al. teach that a driving means for driving the circuit board or the chip transfer means can cope with a variety of patterns of the circuit board and such a manner that the traveling pitch can be freely set. If in fact FUKUSHIMA et al. fail to expressly teach that an ...automatic mounting range step is such the automatic mounting range is set within a predetermined range on a single original board... it is held that this limitation or step would have been obvious to an artisan, given the evidence provided by FUKUSHIMA et al. It is also noted that FUKUSHIMA et al. is aware of using a computer with a stepping motor.”(Paper No. 4, page 2) is respectfully traversed.

It is respectfully submitted that “the automatic mounting range step is such the automatic mounting range is set within a predetermined range on a single original board” is not obvious in view of the disclosure of the ‘979 Patent being applied to the limited situation where the shifting direction of the template is disclosed as vertical and/or horizontal.

Further, the statement in the Office action that “As applied further to Claim 3 it is held to mere design choice to rotate main circuit board 180 degrees to obtain a second area which is coincident with a first area. Applicants provide no specific purpose therefore nor do they articulate and specific problem solved thereby.” (Paper No. 4, page 3) is respectfully traversed.

It is respectfully submitted that, according to an aspect of the present invention, the range in which the chip parts can be mounted by the template of the multi-mounter is smaller than the size of the original board, such as shown in Fig. 8. Therefore, an advantage in the rotation of a main circuit board 180 degrees to obtain a second area which is coincident with a first area is the use of a compact chip parts mounter is promoted whereby the installation cost of the chip parts mounter can be reduced. Furthermore, it is respectfully submitted that

the advantages of the 180 degrees rotational setting are also evident in Figs. 1, 2, 7, 8, 10 to 13, and 15 to 17 of the above-referenced application.

Additionally, the statement in the Office action that "As applied to Claims 3 and 4 wherein the circuit board is used as a main circuit board for a TV receiver, the Patent Office responds that ... circuit boards are used today as means for providing electrical circuits for TV receivers. Hence it would have been obvious to use the circuit boards produced by Applicant's method to provide TV receivers." (Paper No. 4, pages 2 and 3) is respectfully traversed.

It is respectfully submitted, in this regard, an aspect of the present invention, as shown in Figs. 10 and 11 of the above -referenced application, presents an advantage by setting a pair of compound circuit boards each including a main circuit board and a CRT circuit board in a single original board facing each other in a 180 degrees rotated position, and the chip parts for the pair of compound circuit boards for two sets of TV receivers each including a main circuit board and a CRT circuit board can be mounted collectively by a single mounting operation on a single original board.

Wherefore, in view of the foregoing, it is respectfully submitted that it would not have been obvious to combine the teachings of the '979 patent to arrive at the claimed subject matter of independent Claim 1 and dependent Claims 3 and 4. Claims 2 and 5 through 8 depend from and add features to independent Claim 1. Therefore, Claims 2 and 5 through 8 are also allowable for at least the reasons discussed above in connection with independent Claim 1, dependent Claim 7 is further allowable for at least the reasons discussed above in connection with dependent Claim 3, and dependent Claim 8 is further allowable for at least the reasons discussed above in connection with dependent Claim 4.

Withdrawal of the 35 U.S.C. §103(a) rejection of Claims 1 through 8 is respectfully requested.

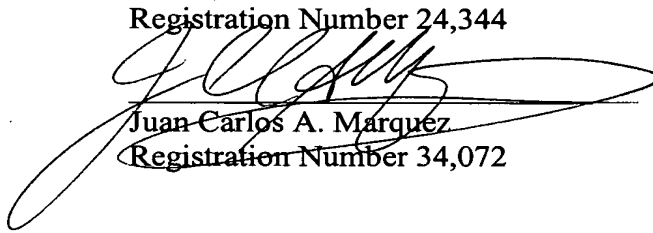
Reconsideration and allowance of Claims 1 through 8, and consideration of new Claims 9 through 16, are respectfully requested.

In view of all the above, Applicants respectfully submit that certain clear and distinct differences as discussed exist between the present invention as now claimed and the prior art reference upon which the rejection in the Office Action relies. These differences are more than sufficient that the present invention as now claimed would not have been anticipated nor rendered obvious given the prior art. Rather, the present invention as a whole is distinguishable, and thereby allowable over the prior art.

Favorable reconsideration of this application as amended is respectfully solicited. Should there be any outstanding issues requiring discussion that would further the prosecution and allowance of the above-captioned application, the Examiner is invited to contact the Applicants' undersigned representative at the address and phone number indicated below.

Respectfully submitted,

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